

OFFICE MEMORANDUM

TO : Tom, Keenan, Group Leader H-7, MS 518  
THRU : R. D. Baker, CMB-Division Leader, MS 756  
FROM : G. R. Waterbury and Al Zerwekh, MS 740  
SUBJECT: TRANSURANIC WASTE RESEARCH & DEVELOPMENT PROGRAM (A412) MONTHLY  
REPORT FOR APRIL, 1977  
SYMBOL : CMB-1

DATE: April 29, 1977

\*

The persistent high percentage of hydrogen in the gas mixture in this drum indicates continuing effective contact of the TRU with the waste matrix.

ANALYTICAL CHEMISTRY

Radiolysis Studies: The compositions of the gases generated in four of the drums containing <sup>238</sup>Pu-contaminated waste in covered trench storage were determined (Table I). The gas in drum 232 at one time contained 9% hydrogen and 6% oxygen, but was not explosible. Currently, after storage for almost 3 years, the hydrogen content is 2.7% and the oxygen 8.5%, suggesting that gaseous diffusion is taking place, and possibly that the rate of gas formation is decreasing. The gaseous contents of drum 301 were explosible after 36 days of storage, but the hydrogen had increased and the oxygen decreased in 64 days to nonexplosible levels.\* Drums 380 and 383 were in storage 15 days when sampled. The rather rapid accumulation of hydrogen in drum 380 indicates good contact of the contaminant with the waste, and the amount of hydrogen in cask 380 indicates ready diffusion from drum to cask. Compare the data for drum 380 with the lack of hydrogen in drum 383 which has the heaviest loading of <sup>238</sup>Pu. The contaminant on the waste matrix in drum 383 must be very poorly distributed. Gas generation will be monitored monthly in drum 380.

Added sentence  
at LB's request

The pressure vessel was obtained for testing samples of fibreglass-impregnated-resin coated plywood contaminated with <sup>238</sup>Pu. These tests will be at a pressure of 17,500 kPa to determine possible effects on  $\alpha$ -attack of the composite matrix.



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TABLE I

Data from  $^{238}\text{Pu}$ -contaminated Waste in Covered-Trench Storage21 April 1977, Ambient Temperature  $9^{\circ}\text{C}$ 

Drum Number	$^{238}\text{Pu}$ Content g	Waste Content Kg	Days in Storage	Temperature, $^{\circ}\text{C}$			Sample With- Drawn From	Gas Composition (Mol %)					N
				In- Side Drum	Out- Side Drum	Soil Under Cask		$\text{H}_2$	$\text{CH}_4$	$\text{O}_2$	$\text{CO}_2$	CO	
232	29.4	10.2	901	25	18	15	Drum Cask	2.7 0.3	0.1 <0.1	8.5 19.0	9.4 <0.1	1.7 0.4	7 7
301	18.7	23.6	503	--	16.5	15	Drum	57.8	1.8	<0.1	22.5	12.0	
380	27.5	27.7	15	16	12	15	Drum Cask	1.8 0.3	0.2 <0.1	18.5 21.4	3.9 <0.1	2.6 0.7	7 7
383	40.0	32.3	15	17.5	15.5	15	Drum Cask	<0.1 <0.1	<0.1 <0.1	20.7 20.9	0.2 <0.1	0.4 0.4	7 7